

What is claimed is;

1. A surface inspection method for inspecting a pattern formed at a surface of a test piece, comprising:

5 a first step in which a plurality of inspection conditions that are different from each other are set;

a second step in which light from the surface of the test piece is detected by irradiating illumination light onto the surface of the test piece under each of  
10 said plurality of inspection conditions;

a third step in which a plurality of sets of detection information corresponding to said plurality of inspection conditions are generated based upon the detected light;

15 a fourth step in which a logical OR of said plurality of sets of detection information is obtained; and

a fifth step in which a decision is made as to whether or not said pattern at the surface of the test  
20 piece is acceptable based upon results of the logical OR.

2. A surface inspection method according to claim 1, wherein in said third step:

25 an image of the surface is formed by condensing

at least one of specific diffracted light, scattered light and reflected light from the surface of the test piece under each of said plurality of different inspection conditions;

5        said image is converted to an image signal; and  
      said detection information is generated based upon said image signal.

3.    A surface inspection method according to claim 1,  
10    wherein:

      said pattern comprises a plural types of cyclical pattern;

      said plurality of inspection conditions are respectively set in correspondence to pitches of said  
15    plural types of cyclic pattern.

4.    A surface inspection method according to claim 1, wherein:

      said plurality of inspection conditions are each  
20    set by rotating the test piece around a specific axis of rotation to change an angle of incidence of said illumination light onto the test piece and a light-receiving angle of the light from the test piece.

25    5.    A surface inspection method according to claim 1,

wherein:

said plurality of inspection conditions are each set by setting at least one of an angle of incidence of said illumination light, a light-receiving angle of the light from the test piece, and a wavelength of said illumination light.

6. A surface inspection method according to claim 1, wherein:

10 said plurality of inspection conditions are each set in conformance to a order of diffracted light corresponding to a specific pitch of the pattern on the test piece.

15 7. A surface inspection method according to claim 1, wherein:

said plurality of inspection conditions are each set by adjusting a wavelength of said illumination light.

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8. A surface inspection method for inspecting a pattern formed at a surface of a test piece, comprising:

a first step in which a plurality of diffraction conditions that are different from each other are set;

a second step in which diffracted light from the surface of the test piece is detected by irradiating illumination light onto the surface of the test piece under each of said plurality of diffraction

5 conditions;

a third step in which a plurality of sets of detection information corresponding to said plurality of diffraction conditions are generated based upon the detected light;

10 a fourth step in which a condition which is other than said diffraction conditions and is outside design diffraction conditions determined in conformance to said pattern is set;

15 a fifth step in which scattered light from the surface of the test piece is detected by irradiating said illumination light onto the surface of the test piece under the condition other than said diffraction conditions;

20 a sixth step in which detection information corresponding to the condition other than said diffraction conditions is generated based upon the scattered light that has been detected;

a seventh step in which a logical OR of said plurality of sets of detection information generated  
25 in said third step and said detection information

generated in said sixth step is obtained; and

an eighth step in which a decision is made as to whether or not said pattern at the surface of the test piece is acceptable based upon results of the logical

5 OR.

9. A surface inspection apparatus that conducts an inspection of a pattern formed at a surface of a test piece, comprising:

10 a stage that holds the test piece;

an illumination device that irradiates illumination light onto the surface of the test piece;

a light-receiving device that detects at least one of diffracted light, scattered light and reflected  
15 light from the test piece;

a drive device that makes it possible to vary at least one of; an angle of inclination of said stage, a position of said illumination device and a position of said light-receiving device, in order to guide the  
20 light from the surface of the test piece to said light-receiving device under a plurality of different inspection conditions; and

an arithmetic operation device that sets said plurality of inspection conditions, generates a  
25 plurality of sets of detection information in

correspondence to said plurality of inspection  
conditions based upon the light detected by said  
light-receiving device, obtains a logical OR of said  
plurality of sets of detection information thus  
5 generated and makes a decision as to whether or not  
said pattern at the surface of the test piece is  
acceptable based upon results of said logical OR.

10. A surface inspection apparatus that conducts an  
10 inspection of a pattern formed at a surface of a test  
piece, comprising:

a first illumination device that irradiates  
illumination light onto the surface of the test piece  
at a variable first angle of incidence;

15 a second illumination device that irradiates  
illumination light from a light source formed in a  
slit onto the surface of the test piece at a second  
angle of incidence larger than said first angle of  
incidence;

20 a light-receiving device that detects light  
originating from the surface of the test piece; and

an arithmetic operation device that generates  
first detection information based upon light  
originating from the surface of the test piece through  
25 irradiation by said first illumination device detected

by said light-receiving device, generates second  
detection information based upon light originating  
from the surface of the test piece through irradiation  
by said second illumination device detected by said  
5 light-receiving device, obtains a logical OR of said  
first detection information and said second detection  
information and makes a decision as to whether or not  
said pattern at the surface of the test piece is  
acceptable based upon results of said logical OR.

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11. A recording medium having recorded therein a  
program employed in a surface inspection apparatus  
that conducts an inspection of a pattern formed at a  
surface of a test piece, said program comprising:

15 a first instruction for setting a plurality of  
different inspection conditions;

a second instruction for detecting light  
originating from the surface of the test piece by  
irradiating illumination light onto the surface of the  
20 test piece under each of said plurality of inspection  
conditions;

a third instruction for generating a plurality of  
sets of detection information corresponding to said  
plurality of inspection conditions based upon the  
25 detected light;

a fourth instruction for obtaining a logical OR  
of said plurality of sets of detection information;  
and

a fifth instruction for making a decision as to  
5 whether or not said pattern at the surface of the test  
piece is acceptable based upon results of said logical  
OR.

12. A data signal embodied in a carrier wave  
10 comprising a program employed in a surface inspection  
apparatus that conducts an inspection of a pattern  
formed at a surface of a test piece, said program  
comprising:

a first instruction for setting a plurality of  
15 different inspection conditions;

a second instruction for detecting light  
originating from the surface of the test piece by  
irradiating illumination light onto the surface of the  
test piece under each of said plurality of inspection  
20 conditions;

a third instruction for generating a plurality of  
sets of detection information corresponding to said  
plurality of inspection conditions based upon the  
detected light;

25 a fourth instruction for obtaining a logical OR



of said plurality of sets of detection information;

and

a fifth instruction for making a decision as to  
whether or not said pattern at the surface of the test  
5 piece is acceptable based upon results of said logical  
OR.